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IS 13163 (1991): Mine haulage tracks - Laying - Code of practice [MED 8: Mining Techniques and Equipment]

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Indian Standard

MINE HAULAGE TRACKS — LAYING — CODE OF PRACTICE

UDC 622·625·144 : 006·76

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

September 1991 **Price Group 2**

Mine Transportation Sectional Committee, HMD 8

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Mine Transportation Sectional Committee had been approved by the Heavy Mechanical Engineering Division Council.

In mining field the importance of efficient mine haulage system is being realised day by day. Properly laid, straight and graded track is regarded as sign of efficient transport system. Maximum output, economically and with maximum safety, are the key parameters for determining the performance of a mine haulage track.

This standard is expected to provide uniform guidelines to those laying and using the tracks. The standard also provides brief information on periodical inspection and maintenace of such tracks.

Indian Standard

MINE HAULAGE TRACKS — LAYING — CODE OF PRACTICE

1 SCOPE

This standard describes a code of practice for laying mine haulage tracks.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
9203 (Part 1) : 1979	Friction rollers for mine haulage tracks: Part 1 Technical supply conditions
9203 (Part 2) : 1979	Friction rollers for mine haulage tracks: Part 2 Parallel rollers
9203 (Part 3) : 1979	Friction rollers for mine haulage tracks: Part 3 Tapered and vertical rollers and horizontal and vertical pulleys
9203 (Part 4) : 1979	Friction rollers for mine haulage tracks: Part 4 Rollers with non-metallic rope bearing surfaces
9227 : 1979	Friction roller mountings for mine haulage tracks

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Boxing-In

It means putting in the ballast in the spaces between the sleepers.

3.2 Fettling

It is the work done to ensure that the track is on the line and that all waves are removed.

3.3 Formation

The part of the rock floor of the roadway on which track is laid.

3.4 Opening Out

It means removing the ballast to the bottom of the sleeper and in the spaces between the sleeper.

3.5 Packing

It means inserting ballast under sleeper to ensure proper distribution of weight.

4 MATERIALS

4.1 Various materials and components/parts used in laying the mine haulage tracks shall conform to predetermined and pre-selected standards and norms. Special attention shall be given while selecting and using rails; fish plates and fish bolts, sleepers and rail fastenings; gauge ties, ballast, etc.

4.2 While selecting and using the materials, components/parts due consideration shall be given to economical but efficient use of tracks keeping the 'safety' aspect above all.

4.3 Since the quality of ballast has a very important bearing on the standard of the finished track, the most suitable available material shall be used all the times. Few suggested materials are:

a) Crushed granite,
b) Crushed lime stone,
c) Crushed blast furnace slag,
d) Crushed hard stone,
e) Selected mine rocks, and
f) Fused boiler clinkers.

4.4 The essential characteristics of ballast shall be as given below.

4.4.1 It shall not crumble or disintegrate easily under working conditions either due to load or due to wet surroundings.

4.4.2 It shall have a high frictional characteristic so that the mass shall bind well together when laid down and yet remain porous to allow drainage and to maintain an elastic road bed.

4.4.3 The coarser material shall be used for the initial layer of ballast and the finer for the final packing and lifting to grade.

4.4.4 Crushed slag and clinker are unsuitable for damp conditions as they lead to increased corrosion of the rails.

4.4.5 Since some mine rocks disintegrate in wet conditions, care shall be taken while using these particular rock ballast.

4.4.6 Ballast of inert material shall be preferred in case of gassy mines where use of carbonaceous material such as coally shale, coal, etc, is to be avoided.

5 MARKING AND SIZE OF ROADWAYS

5.1 Marking

Roadways shall be made such that the line of roads shall be regular both on straight as well as round curves. It shall be ensured that the roadway is of uniform gradient and its alignment shall more or less be straight except at curves. The track shall be laid with proper alignment and gradient.

5.2 Size

The sizes of the roadways shall be such that, including the clearance, they conform to the Statutory Acts, Rules and Regulations.

6 BALLASTING

6.1 Ballasting of tracks is important from performance point of view. Ballast shall be such that it fulfills its basic functions such as to transfer the applied load over a large supporting surface, holding the sleepers in a horizontal plane but allow them to be readily adjusted in a vertical plane to maintain correct gradient and provide an elastic road-bed.

6.2 Laying of Ballast

6.2.1 To prepare the formation, the floor of the roadway shall be roughly graded out at a depth of at least 100 mm to 300 mm from the bottom of the rail depending on the competence of the rock formation on which the track is being laid subject to the condition that such thickness shall not be less than the thickness of the sleeper.

6.2.2 A thick bed of ballast varying between 75 mm to 150 mm depending upon condition and load shall be provided between the sleeper and the formation.

6.2.3 Where considerable floor lift is anticipated, this depth of formation shall be increased to allow for extra ballast which can then be removed to maintain the correct rail level and grade as the floor rises.

6.2.4 Ballast shall be spread before the sleepers are laid. Size of ballast shall not be larger than 50 mm nor finer than 15 mm.

6.2.5 It is important that the sleepers shall have a firm support and ballast shall be tamped under them and particularly under the ends and under the rails, while it shall be loose under the middle of the track.

7 MARKING FOR TRACK LINES

7.1 Lines of proposed tracks shall be marked clearly on the roof of the roadways. These shall be known as 'Track Lines'.

7.1.1 The track line shall be marked directly above the one rail of the track, so that by plumbing down this line, another rail can be set to gauge.

8 MARKING OF GRADE LINES

8.1 The grade lines for track shall be clearly marked on the side of the roadway at a predetermined height above the final rail level.

8.2 By marking grade lines on both sides of the roadway, cross levelling of the track shall be easy. Also, the track layers may string across the roadway and measure down to the rail heads.

9 CHANNELS

9.1 In wet conditions, a channel shall be marked and cut at one side to facilitate flow of water.

9.2 Depth of the channel shall be such that the normal water level in the channel shall remain below the bottom of the ballast.

9.3 Edge

Edge of the channel shall be at least 600 mm from the gauge line of the track to allow correct ballasting. Also, ends of the sleepers shall not block the channel.

9.4 In some cases it may also be required to line the channel with wood or concrete slabs to stop rush of water washing away the channel sides and ultimately destroying the drainage system.

9.5 If it is required that the channel has to cross the track, then in that case, the channel shall be completely covered over and protected from blockage at each end, since such a blockage may rapidly lead to flooding of the roadbed.

10 INSPECTION AND MAINTENANCE

10.1 Once the track has been laid and boxed-in it shall be essential to follow a systematic schedule of inspection and maintenance, to keep the track in a safe condition and for the efficient working of the haulage system. The schedule of inspection and maintenance shall include daily, weekly and annual checks to be made and corrective actions to be taken.

10.1.1 *Daily Inspection and Maintenance*

10.1.1.1 Haulage track, used by locomotives, shall be examined at least once in 24 hours. It is recommended that all heavy haulage tracks shall be examined in the same way.

10.1.1.2 The person incharge of each gang for inspection and maintenance of track layer shall daily examine and report on all the track layer under his charge. The arrangement may include that he walks one way and rides the other portion. He shall ensure that all points, crossings and movable parts are thoroughly examined and lubricated. Any defect found during the inspection shall receive his immediate attention and shall be rectified.

10.1.2 *Weekly Inspection and Maintenance*

It shall include the following:

a) All fasteners and fish bolts shall be tested with hammer and a spanner and tightened if found loose. Also the rails and sleepers shall be checked for cracks, fractures etc and replaced if needed;

b) All curves shall be inspected to check super elevation and alignment;

c) All turnouts and crossings shall receive particular attention; and

d) Inspection of alignments, levels and clearance along the length of the tracks shall be made.

10.1.2.1 The head lamp of the locomotives, if available, shall be used to detect bad alignment and level. The person incharge for inspection and maintenance shall stand about 15 to 20 meters from the locomotive and then by looking towards the head lamp, he shall see the defects, if any, for corrective action.

10.1.2.2 Horizontal and vertical rollers used for guiding ropes, skid plates, etc, shall be checked and replaced if found damaged. Rollers and pulleys conform to IS 9203 (Parts 1 to 4) : 1979. The mountings shall conform to IS 9227 : 1979.

10.1.3 *Annual Inspection and Maintenance*

10.1.3.1 All main haulage tracks and men riding tracks shall be examined at least once a year as specified in **10.1.3.2.**

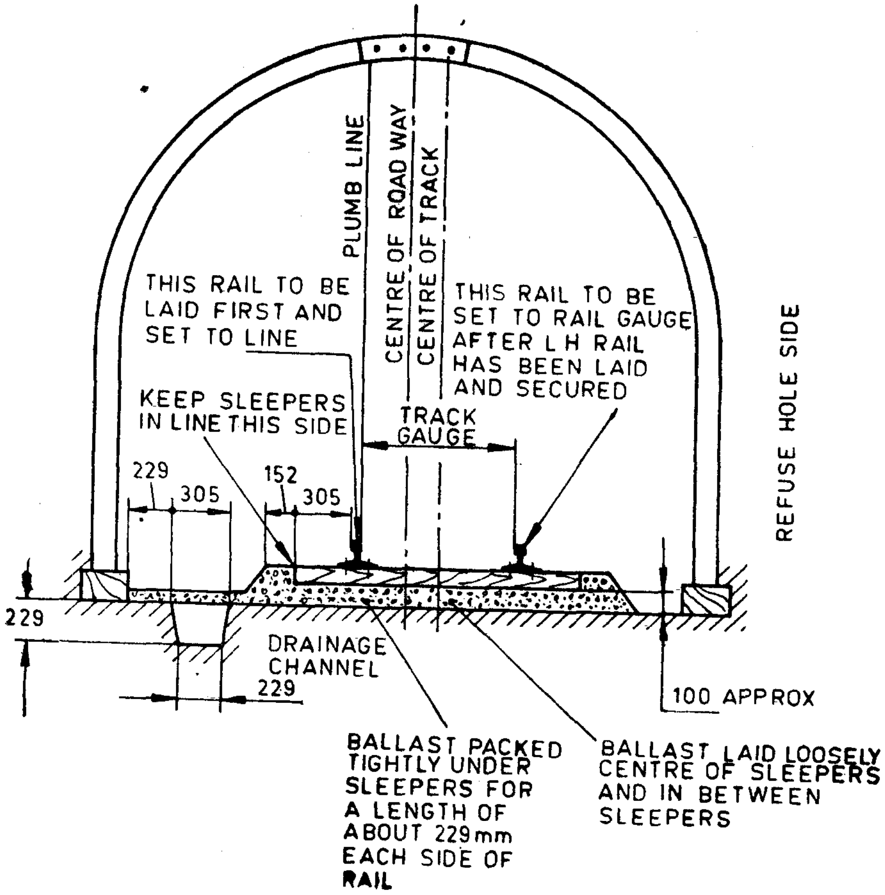
10.1.3.2 All fish plates shall be removed, the ends of the rails examined, cleaned, fish plates greased and bolts oiled; and worn out fish plates replaced. All fasteners and sleepers shall be re-examined for further use or discarding before these are re-used after annual inspection.

10.2 Any fasteners or sleepers or other components which do not appear to be in good condition, shall be examined under load that is, as the train passes over them, as these defects may not be revealed.

11 TYPICAL SECTIONS OF TRACKS

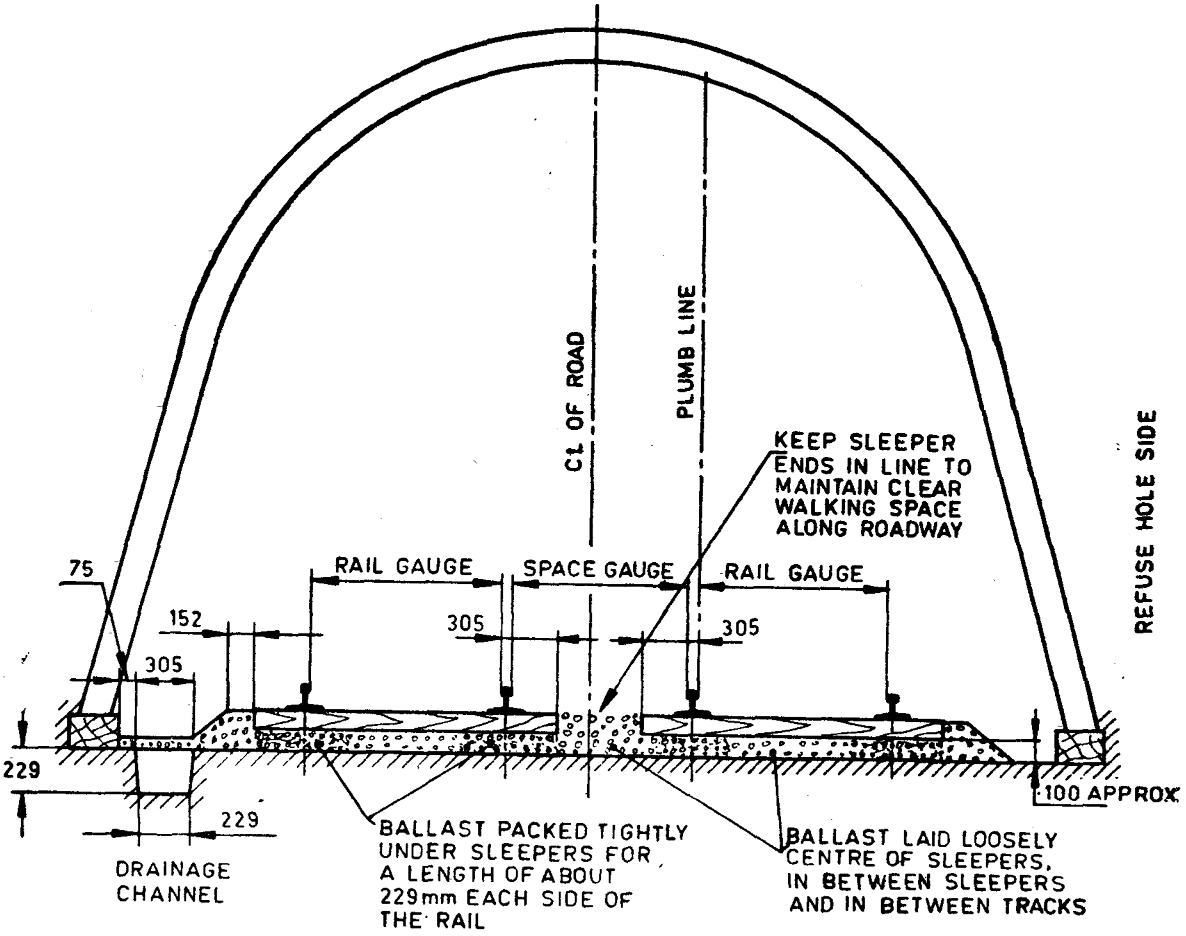
11.1 Typical section across straight single track roadway with drainage channel is given in Fig. 1.

11.2 Typical section across curved double track roadway with drainage channel is given in Fig. 2.


PLUMB LINE
CENTRE OF ROAD WAY
CENTRE OF TRACK
THIS RAIL TO BE LAID FIRST AND SET TO LINE
THIS RAIL TO BE SET TO RAIL GAUGE AFTER L H RAIL HAS BEEN LAID AND SECURED
REFUSE HOLE SIDE
KEEP SLEEPERS IN LINE THIS SIDE
TRACK GAUGE
229
305
152
305
229
DRAINAGE CHANNEL
229
100 APPROX
BALLAST PACKED TIGHTLY UNDER SLEEPERS FOR A LENGTH OF ABOUT 229 mm EACH SIDE OF RAIL
BALLAST LAID LOOSELY CENTRE OF SLEEPERS AND IN BETWEEN SLEEPERS

All dimensions in millimetres.

FIG. 1 TYPICAL SECTION ACROSS STRAIGHT SINGLE TRACK ROADWAY WITH DRAINAGE CHANNEL


CL OF ROAD
PLUMB LINE
REFUSE HOLE SIDE
KEEP SLEEPER ENDS IN LINE TO MAINTAIN CLEAR WALKING SPACE ALONG ROADWAY
75
152
305
RAIL GAUGE
SPACE GAUGE
RAIL GAUGE
305
305
229
229
100 APPROX
DRAINAGE CHANNEL
BALLAST PACKED TIGHTLY UNDER SLEEPERS FOR A LENGTH OF ABOUT 229mm EACH SIDE OF THE RAIL
BALLAST LAID LOOSELY CENTRE OF SLEEPERS, IN BETWEEN SLEEPERS AND IN BETWEEN TRACKS

All dimensions in millimetres.

FIG. 2 TYPICAL SECTION ACROSS CURVED DOUBLE TRACK ROADWAY WITH DRAINAGE CHANNEL

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